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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,098	12/21/2005	Takashi Ito	9369-114US (T37-196236C)	8148
570 7590 08/19/2008 PANITCH SCHWARZE BELISARIO & NADEL LLP ONE COMMERCE SQUARE 2005 MARKET STREET, SUITE 2200 PHILADELPHIA, PA 19103			EXAMINER EOFF, ANCA	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 08/19/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,098	Applicant(s) ITO ET AL.	
	Examiner ANCA EOF	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3 and 5-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1, 3 and 5 -10 are pending in the application. Claims 2 and 4 are canceled.
2. The foreign priority document JP 2003-180470, filed on June 25, 2003 was received and acknowledged. However, in order to benefit of the earlier filing date, a certified English translation is required.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 14, 2008 has been entered.

Claim Rejections - 35 USC § 103

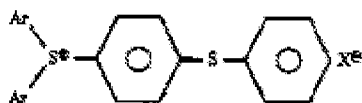
4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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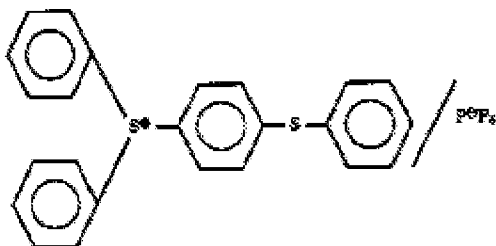
5. Claims 1, 3, 5-6 and 9-10 are rejected under 35 U.S.C. 103(a) as obvious over Ohkuma et al. (US Patent 5,776,634) in view of Date et al. (WO 02/48101, wherein the citations are from the English equivalent document, US Pg-Pub 2004/0030158).

With regard to claims 1, 3 and 10, Ohkuma et al. disclose a photosensitive recording medium composition containing a radical-polymerizable monomer, a cationic-polymerizable monomer, a radical polymerization initiator and a cationic-polymerization initiator (abstract). The cationic-polymerization initiator may be represented by the formula (I):



(I) (column 10, lines 1-10), wherein Ar is an aryl group and X^+ may be PF_6^+ and SbF_6^+ (column 10, lines 23-24). This compound having as Ar a phenyl group is equivalent to the compound of formula (I) of the instant application.

A specific example of the compound of formula (I) is represented by the formula (II):



(II) (column 12, lines 40-49).

The compound of formula (II) is equivalent to the compound of formula (I) of the instant application when M is a phosphorus atom.

However, Ohkuma et al. do not teach the purity of the cationic-polymerization initiator, as required by the instant application.

Date et al. disclose a method of manufacturing sulfonium salts used as photocationic polymerization initiators for resists (par.0045).

In Examples 1-3, Date et al. disclose the synthesis of (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate with a purity of 99 % (par.0047-0062). Date et al. further disclose that ¹³C-NMR analysis and IR analysis indicated that the (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate comprises small amounts of raw materials, such as diphenyl sulfoxide, diphenyl (par.0050, 0055 and 0058).

In Example 5, Date et al. disclose the synthesis of (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate with a purity of 99% (par.0063-0065). It is not explicitly specified that (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate is synthesized in Example 5 but the ingredients are the same as for Example 2 which leads to (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate except that potassium hexafluoroantimonate replaces potassium hexafluorophosphate. Date et al. further disclose that ¹³C-NMR analysis and IR analysis indicated that the (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate comprises small amount so raw materials diphenyl sulfoxide, diphenyl sulfide(par.0052-0053 and par.0063-0064).

It is the examiner's position that there is no compound represented by formula (II) of the instant application in the (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate of Examples 1-3 and (4-phenylthiophenyl) diphenylsulfonium

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hexafluoroantimonate of Example 5 of Date et al., therefore the limitations of claims 1 and 10 for the quantity of compound of formula (II) are met.

It would have been obvious for one of ordinary skill in the art to use the sulfonium salt, such as (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate and (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate with a purity of 99% obtained in the process of Date et al. as photocationic polymerization initiators in the composition of Ohkuma et al., since Date et al. specifically indicate this use for the high-purity sulfonium salts (Date et al., par.0045 and par.0062).

With regard to claim 5, Ohkuma et al. disclose that the cationic-polymerizable monomer comprises at least an epoxy group (see examples in column 5-6).

With regard to claim 6, Ohkuma et al. disclose that the radical-polymerizable monomer includes compounds with (meth)acryl groups (see examples in column 3, lines 17-48).

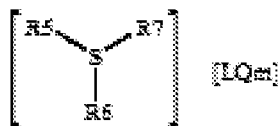
With regard to claim 9, Date et al. disclose the synthesis of (4-phenylthiophenyl)diphenylsulfonium hexafluoroantimonate in Example 5 (par.0063-0065). The purity of the compound is more than 99% so raw materials are comprised in an amount of less than 1% (par.0064 shows that raw materials are the impurities found in the compound).

Since the raw materials for the synthesis of 4-phenylthiophenyl)diphenylsulfonium hexafluoroantimonate and 4-phenylthiophenyl)diphenylsulfonium hexafluorophosphate comprise about 30% diphenylsulfoxide (Examples 2 and 5 in par.0052-0053 and par.0063), it would be

expected that the mixture of raw materials left as residues in the of 4-phenylthiophenyl)diphenylsulfonium hexafluoroantimonate and 4-phenylthiophenyl)diphenylsulfonium hexafluorophosphate would comprise 30% diphenylsulfoxide. Therefore, the 4-phenylthiophenyl)diphenylsulfonium hexafluoroantimonate obtained in Example 5 and the 4-phenylthiophenyl)diphenylsulfonium hexafluorophosphate obtained in Example 2 would comprise less than 0.3% of diphenylsulfoxide, which encompasses the range claimed in claim 9 of the instant application.

6. Claims 1, 3, 5-6 and 10 are rejected under 35 U.S.C. 103(a) as obvious over Thommes et al. (US Pg-Pub 2003/0149124) in view of Date et al. (WO 02/48101, wherein the citations are from the English equivalent document, US Pg-Pub 2004/0030158).

With regard to claims 1, 3 and 10, Thommes et al. disclose a radiation curable resin comprising both radically and cationically polymerizable components and also radical and cationic photoinitiators (par.0092), wherein one of the preferred cationic photoinitiator is represented by the formula (III):



(III) (formula (III) in par.0036), wherein R_5 , R_6 , R_7 may be substituted or unsubstituted phenyl groups (par.0037 and par.0042) and LQ_m^- may be PF_6^- or SbF_6^- (par.0041). One of the substituents indicated for R_5 - R_7 is a phenylthio group (par.0040).

While giving the general formula (III) for the cationic photoinitiator, Thommes et al. do not specifically disclose the compound of formula (I) of the instant application.

Date et al. disclose a method of manufacturing sulfonium salts used as photocationic polymerization initiators for resists (par.0045).

In Examples 1-3, Date et al. disclose the synthesis of (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate with a purity of 99 % (par.0047-0062). Date et al. further disclose that ^{13}C -NMR analysis and IR analysis indicated that the (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate comprises small amounts of raw materials, such as diphenyl sulfoxide, diphenyl (par.0050, 0055 and 0058).

In Example 5, Date et al. disclose the synthesis of (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate with a purity of 99% (par.0063-0065). It is not explicitly specified that (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate is synthesized in Example 5 but the ingredients are the same as for Example 2 which leads to (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate except that potassium hexafluoroantimonate replaces potassium hexafluorophosphate. Date et al. further disclose that ^{13}C -NMR analysis and IR analysis indicated that the (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate comprises small amount so raw materials diphenyl sulfoxide, diphenyl sulfide(par.0052-0053 and par.0063-0064).

It is the examiner's position that there is no compound represented by formula (II) of the instant application in the (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate of Examples 1-3 and (4-phenylthiophenyl) diphenylsulfonium

hexafluoroantimonate of Example 5 of Date et al., therefore the limitations of claims 1 and 10 for the quantity of compound of formula (II) are met.

It would have been obvious for one of ordinary skill in the art to use the sulfonium salt, such as (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate and (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate with a purity of 99% obtained in the process of Date et al. as photocationic polymerization initiators in the composition of Thommes et al., since Date et al. specifically indicate this use for the high-purity sulfonium salts (Date et al., par.0045 and par.0062) and since the sulfonium salts of Date et al. meet the conditions of general formula (III) of Thommes et al.

With regard to claim 5, Thommes disclose that the cationically curable component A) may be a compound comprising at least one epoxy group (par.0018).

With regard to claim 6, disclose that the radically-polymerizable component D) may comprise (meth)acrylate groups (par.0065-0067).

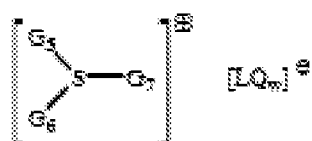
7. Claims 1, 3, 5-6 and 9-10 are rejected under 35 U.S.C. 103(a) as obvious over Melisaris et al. (US Patent 6,099,787) in view of Date et al. (WO 02/48101, wherein the citations are from the English equivalent document, US Pg-Pub 2004/0030158).

With regard to claims 1, 3 and 10, Melisaris et al. disclose a radiation-curable composition comprising a mixture of at least one radiation cationically polymerizable compound and/or at least one free radical polymerizable compound and at least one photoinitiator for cationic and/or radical polymerization (abstract). The particularly preferable compositions are hybrid systems, i.e. compositions which contain at least

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one compound which can be cured by means of free radicals and a free-radical polymerization initiator, as well as the cationically curable components (column 12, lines 48-52).

The photoinitiator for cationic polymerization may be an onium salt represented by the general formula (IV):



(IV) (formula (3) in column 8, lines 20-25), wherein G_5 , G_6 and G_7 may be phenyl radicals (column 8, lines 26 and 32) and LQ_w^- may be PF_6^- , SbF_6^- (column 8, lines 44-45). The groups G_5 , G_6 and G_7 may be substituted and a substituent disclosed by Melisaris et al. is a phenylthio group (column 8, lines 32-42).

While giving the general formula (IV) for the cationic photoinitiator, Melisaris et al. do not specifically disclose the compound of formula (I) of the instant application.

Date et al. disclose a method of manufacturing sulfonium salts used as photocationic polymerization initiators for resists (par.0045).

In Examples 1-3, Date et al. disclose the synthesis of (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate with a purity of 99 % (par.0047-0062). Date et al. further disclose that ^{13}C -NMR analysis and IR analysis indicated that the (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate comprises small amounts of raw materials, such as diphenyl sulfoxide, diphenyl (par.0050, 0055 and 0058).

In Example 5, Date et al. disclose the synthesis of (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate with a purity of 99% (par.0063-0065). It is not explicitly specified that (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate is synthesized in Example 5 but the ingredients are the same as for Example 2 which leads to (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate except that potassium hexafluoroantimonate replaces potassium hexafluorophosphate. Date et al. further disclose that ^{13}C -NMR analysis and IR analysis indicated that the (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate comprises small amount so raw materials diphenyl sulfoxide, diphenyl sulfide(par.0052-0053 and par.0063-0064).

It is the examiner's position that there is no compound represented by formula (II) of the instant application in the (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate of Examples 1-3 and (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate of Example 5 of Date et al., therefore the limitations of claims 1 and 10 for the quantity of compound of formula (II) are met.

It would have been obvious for one of ordinary skill in the art to use the sulfonium salt, such as (4-phenylthiophenyl) diphenylsulfonium hexafluorophosphate and (4-phenylthiophenyl) diphenylsulfonium hexafluoroantimonate with a purity of 99% obtained in the process of Date et al. as photocationic polymerization initiators in the composition of Thommes et al., since Date et al. specifically indicate this use for the high-purity sulfonium salts (Date et al., par.0045 and par.0062) and since the sulfonium salts of Date et al. meet the conditions of general formula (IV) of Melisaris et al.

With regard to claim 5, Melisaris et al. disclose that the cationically polymerizable compound may be a compound with an epoxy group (column 7, lines 33-48).

With regard to claim 6, Melisaris et al. disclose that the radical polymerizable compound may be a (meth)acrylate (column 13, lines 1-22).

With regard to claim 9, Date et al. disclose the synthesis of (4-phenylthiophenyl)diphenylsulfonium hexafluoroantimonate in Example 5 (par.0063-0065). The purity of the compound is more than 99% so raw materials are comprised in an amount of less than 1% (par.0064 shows that raw materials are the impurities found in the compound).

Since the raw materials for the synthesis of 4-phenylthiophenyl)diphenylsulfonium hexafluoroantimonate and 4-phenylthiophenyl)diphenylsulfonium hexafluorophosphate comprise about 30% diphenylsulfoxide (Examples 2 and 5 in par.0052-0053 and par.0063), it would be expected that the mixture of raw materials left as residues in the of 4-phenylthiophenyl)diphenylsulfonium hexafluoroantimonate and 4-phenylthiophenyl)diphenylsulfonium hexafluorophosphate would comprise 30% diphenylsulfoxide. Therefore, the 4-phenylthiophenyl)diphenylsulfonium hexafluoroantimonate obtained in Example 5 and the 4-phenylthiophenyl)diphenylsulfonium hexafluorophosphate obtained in Example 2 would comprise less than 0.3% of diphenylsulfoxide, which encompasses the range claimed in claim 9 of the instant application.

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8. Claims 7-8 are rejected under 35 U.S.C. 103(a) as obvious over Ohkuma et al. (US Patent 5,776,634) in view of Date et al. (WO 02/48101, wherein the citations are from the English equivalent document, US Pg-Pub 2004/0030158) as applied to claim 1 and in further view of Steinmann (US Pg-Pub 2004/0137368).

With regard to claims 7-8, Ohkuma modified by Date teach the composition of claim 1 (see paragraph 5 of the Office Action) but Ohkuma and Date fail to disclose that the composition comprises an oxetane compound and a polyalkylene ether compound.

Steinmann discloses a radiation-curable composition useful for the production of three dimensional articles by stereolithography comprising:

- (A) at least one cationically polymerizing organic substance;
- (B) at least one free-radical polymerizing organic substance;
- (C) at least one cationic polymerization initiator;
- (D) at least one free-radical polymerization initiator (par.0023-0027).
- (E) at least one hydroxyl-functional compound (par.0028)
- (F) at least one hydroxyl-functional oxetane compound (par.0029).

The preferred compound (F) is 3-ethyl-3-hydroxymethyl-oxetane (par.0110)

In Example 1 (table 2, par.0151), Steinmann specifically discloses that 3-ethyl-3-hydroxymethyl-oxetane (Cyracure UVR 6000, in table 1, par.0143) is comprised in the radiation-curable composition at a ratio of 26.78 wt.% with respect to the 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate (Cyracure UVR 6110, in table 1, par.0143).

Steinmann discloses that the one hydroxyl-functional compound (E) (par.0023-par.0028) may be polypropylene glycols of various molecular weights (par.0094), glycerine propoxylated polyether triol and polyethyleneglycols (par.0103). These compounds are equivalent to the polyalkylene ether compounds of the instant application.

In Example 1 (table 2, par.0151), Steinmann specifically discloses that glycerine propoxylated polyether triol (Voranol CP 450 in table 1, par.0143) is comprised in the radiation-curable composition at a ratio of 17.85 wt.% with respect to 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate (Cyracure UVR 6110, in table 1, par.0143).

The composition of Steinmann et al. gives exceptionally high photospeed, has low viscosity, low humidity sensitivity and high temperature resistance (par.0002).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add a at least one hydroxyl-functional compound, such as polypropylene glycols of various molecular weights, glycerine propoxylated polyether triol and polyethyleneglycols and at least one hydroxyl-functional oxetane compound , as disclosed by Steinmann to the composition of Ohkuma modified by Date, in order to obtain a composition with exceptionally high photospeed, has low viscosity, low humidity sensitivity and high temperature resistance (Steinmann, par.0002).

Response to Arguments

9. Applicant's arguments filed on July 14, 2008, with respect to the rejection of claims 1 and 3-10 under 35 USC 103(a) over Steinmann (US Pg-Pub 2004/0137368) in view of Date et al. (WO 02/48101, wherein the citations are from the English equivalent document, US Pg-Pub 2004/0030158) have been fully considered and are persuasive.

On page 5 of the Remarks, the applicant shows that the highly pure compound of formula (I) improves the aging stability during operation and the storage stability of the composition. This is supported by the Examples 1 and 2 and the Comparative Examples 1 and 2 in the specification of the instant application, wherein the Comparative Examples 1 and 2 the composition comprises the cationic photoinitiator UVI 6974 (same as in Steinmann).

Therefore, the rejection has been withdrawn. However, upon further consideration, new grounds of rejection are presented above.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Land (US Patent 4,694,029) discloses a photopolymerizable composition comprising a polymerizable epoxy -containing material a polymerizable (meth) acrylate monomer, a cationic photoinitiator and a radical-type photoinitiator (abstract), wherein the cationic photoinitiator may be a sulfonium salt (column 4, lines 5-49)

Sato et al. (US Patent 4,702,846) discloses a photosensitive composition comprising the following components: A) a cationic polymerizable compound and a radical polymerizable compound, B) a cationic polymerization initiating material and C) a radical polymerization initiating material (abstract), wherein the cationic polymerization initiating material may be a sulfonium salt, such as triarylsulfonium salts (column 5, lines 17-20).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANCA EOFF whose telephone number is (571)272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/A. E./
Examiner, Art Unit 1795

/Cynthia H Kelly/
Supervisory Patent Examiner, Art Unit 1795